

Biological Assessment Report

West Fork Black River Reynolds County, Missouri

Spring 2009 – Fall 2009

Prepared for:
Missouri Department of Natural Resources
Division of Environmental Quality
Water Protection Program
Water Pollution Control Branch

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1.0 Introduction

At the request of the Missouri Department of Natural Resources (**MDNR**), Water Protection Program (**WPP**), the Environmental Services Program (**ESP**), Water Quality Monitoring Section (**WQMS**) conducted a macroinvertebrate bioassessment and habitat study of West Fork Black River, water body identification number 2755, in Reynolds County in southeastern Missouri. See the inset in Figure 1 for general stream location of the West Fork Black River stations.

In 1998, 31.7 miles of the West Fork Black River from sec. 21, T. 32 N., R. 2 E. at the confluence with Black River upstream to sec. 25, T. 33 N., R. 3 W. was listed on the 303(d) list for elevated nutrients. In 2008 a 1.3 mile section of the river from approximately the West Fork Mine Outfall and downstream was listed on the 303(d) list for lead and nickel. West Fork Black River is classified as a class “P” stream per the Missouri Water Quality Standards (**WQS**) (MDNR 2009a) with the following designated uses: livestock and wildlife watering; protection of warm water aquatic life and human health fish consumption; cool water fishery; and category A whole body contact recreation.

1.1 Purpose

The purpose of the study was to assess the habitat characteristics, macroinvertebrate community, and physicochemical characteristics of West Fork Black River to determine if the biological community is impaired.

1.2 Tasks

- 1) Conduct a habitat assessment of West Fork Black River.
- 2) Conduct a bioassessment of the macroinvertebrate community of West Fork Black River.
- 3) Conduct physicochemical monitoring of West Fork Black River.

1.3 Null Hypotheses

- 1) Habitat will not differ substantially between the West Fork Black River stations and the reference station.
- 2) Macroinvertebrate assemblages will not differ substantially between longitudinally separate reaches of West Fork Black River.
- 3) Macroinvertebrate assemblages will not differ substantially between West Fork Black River and the bioreference streams in the Ozark/Black/Current Ecological Drainage Unit (**EDU**).

2.0 Methods

Sampling was conducted during the spring and fall 2009 sampling seasons. Spring sampling was conducted on April 17, 2009 and consisted of macroinvertebrate sampling and water quality sampling at two stations on West Fork Black River. During the fall macroinvertebrate sampling, habitat assessments, and water quality sampling were conducted on October 13, 2009 at the same two stations. Methods are included for

biological assessments, stream habitat assessments, and physicochemical water quality collection.

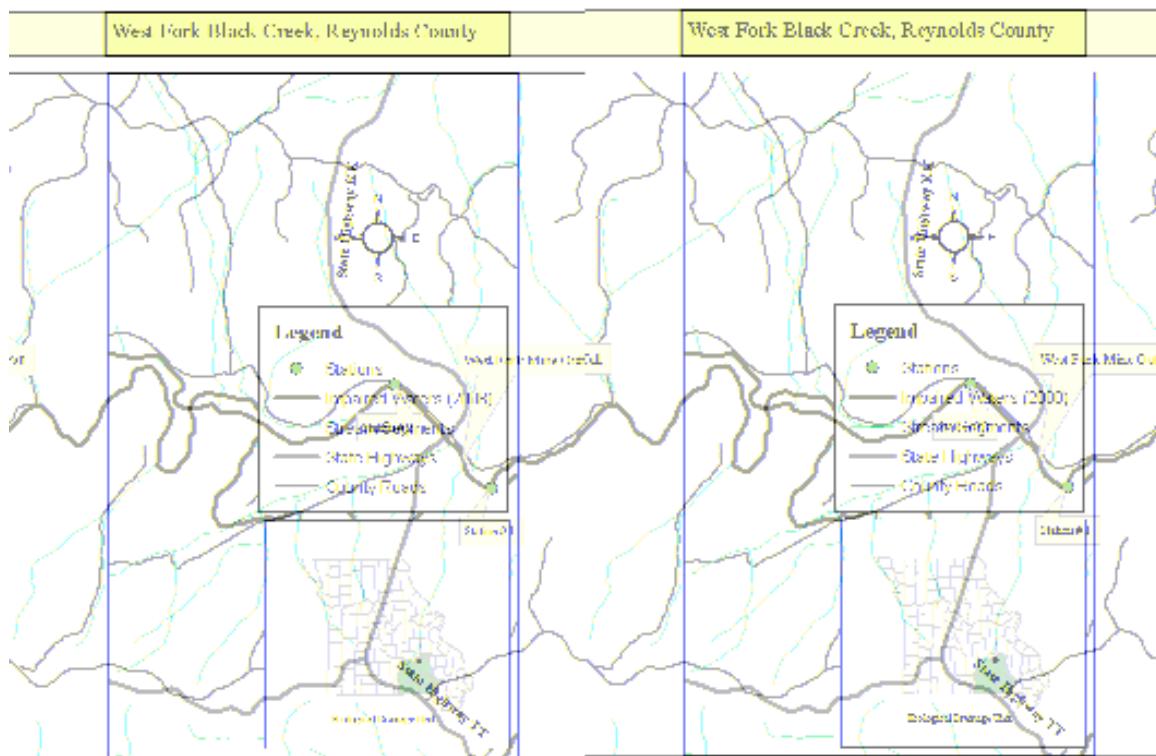
2.1 Station Descriptions

The study included sampling two stations on West Fork Black River in Reynolds County (Figure 1). Station locations and descriptions are listed below in Table 1.

Table 1
Descriptive Information for the West Fork Black River Stations

Stations	Location-UTM Zone 15	Description	County
West Fork Black River 1	667620 E 4150780 N	Approx. 0.2 miles downstream of the West Fork Mine Outfall.	Reynolds
West Fork Black River 2	666470 E 4151996 N	Approx. 0.2 miles upstream of State Highway KK	Reynolds

Figure 1
West Fork Black River Sampling Stations for Spring and Fall 2009 Sampling Seasons



2.1.1 Land Use Description

The West Fork Black River is located within the Ozark/Black/Current EDU. An EDU is a region in which biological communities and habitat conditions can be expected to be similar. Maps of the EDU and the local sampling locations can be found in Figure 1.

Table 2 compares the land cover percentages from the Ozark/Black/Current EDU and the 14-digit Hydrologic Unit Code (**HUC**) that contains the sampling reaches of the West Fork Black River. Percent land cover data were derived from Thematic Mapper satellite images from 2000-2004 and interpreted by the Missouri Resource Assessment Partnership (MoRAP).

Table 2
Percent Land Cover in West Fork Black River
Stations and Ozark/Black/Current EDU

Stations	14-digit HUC	Urban	Crops	Grass	Forest
West Fork Black River 1	11010007020003	0	0	6	90
West Fork Black River 2	11010007020003	0	0	6	90
Ozark/Black/Current EDU	-----	1	0	23	72

2.2 Stream Habitat Assessment Project Procedure

Standardized assessment procedures were followed as described for riffle/pool prevalent streams in the Stream Habitat Assessment Project Procedure (**SHAPP**) (MDNR 2010a). According to the SHAPP, the aquatic community is influenced by the quality of the stream habitat. Stream habitat quality is scored for each station and the scores are compared with the control (reference) SHAPP scores. If the SHAPP score at a test station is $\geq 75\%$ of the SHAPP control scores, the stream habitat at the test station is considered to be comparable to the control (reference) stream. Sinking Creek, located in Reynolds County, is a biocriteria reference site and was chosen as the SHAPP control. The SHAPP scores were calculated for the West Fork Black River stations, compared to the reference SHAPP, and examined for irregular results.

2.3 Bioassessment

2.3.1 Macroinvertebrate Sampling and Analyses

Macroinvertebrate sampling was conducted according to the Semi-quantitative Macroinvertebrate Stream Bioassessment Project Procedure (**SMSBPP**) (MDNR 2010b). West Fork Black River is considered a riffle/pool dominated system. The three standard habitats sampled at all locations were: flowing water over coarse substrate (**CS**); non-flowing water over depositional substrate (**NF**); and rootmat (**RM**). Macroinvertebrate samples were subsampled in the laboratory and identified to specific taxonomic levels (MDNR 2010c) in order to develop biological criteria metrics (MDNR 2010b).

Macroinvertebrate data were evaluated by comparing the data with the bioreference streams in the Ozark/Black/Current EDU. Biological criteria are calculated separately for the spring (mid-March through mid-April) and fall (mid-September through mid-

October) index periods. The SMSBPP provides details on the calculation of metrics and scoring of the multi-metric Missouri Stream Condition Index (**MSCI**). The four components of the MSCI are: Taxa Richness (**TR**); total number of taxa in the orders Ephemeroptera, Plecoptera, and Trichoptera Taxa (**EPTT**); Biotic Index (**BI**); and the Shannon Diversity Index (**SDI**). An MSCI score of 16-20 is considered as fully biologically supporting, 10-14 as partially supporting, and 4-8 as non-supporting of aquatic life.

2.3.2 Physicochemical Water Sampling and Analyses

Physicochemical water samples were handled according to the appropriate MDNR, ESP Standard Operating Procedure (**SOP**) and/or Project Procedure (**PP**). Results for physicochemical water parameters were examined by season and station. All physicochemical water parameters were sampled by field measurements or grab samples. Water samples were collected according to the SOP MDNR-ESP-001 Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations (MDNR 2009b). All samples were kept on ice during transport to ESP.

Water quality parameters were measured *in-situ* or collected and returned for analysis at the state environmental laboratory. Temperature (°C) (MDNR 2010d), pH (MDNR 2009c), specific conductance (µS) (MDNR 2010e), dissolved oxygen (mg/L) (MDNR 2009d), and discharge (cubic feet per second-cfs) (MDNR 2010f) were measured in the field. Turbidity (NTU) (MDNR 2010g) was measured and recorded in the ESP, WQMS biology laboratory. The ESP, Chemical Analysis Section (**CAS**) in Jefferson City, Missouri conducted the analyses for ammonia-nitrogen (mg/L), nitrate+nitrite-nitrogen (mg/L), total nitrogen (mg/L), chloride (mg/L), non-filterable residue (mg/L), and total phosphorus (mg/L).

Physicochemical water parameters were compared between stations as well as with Missouri's WQS (MDNR 2009a). Interpretation of acceptable limits in the WQS may be dependent on a stream's classification and its beneficial uses as designated in the WQS (MDNR 2009a).

2.3.3 Discharge

Stream flow was measured using a Marsh-McBirney Model 2000 Flo-Mate current meter at each station during both sampling seasons. Velocity and depth measurements were recorded at each station according to SOP MDNR-ESP-113 Flow Measurement in Open Channels (MDNR 2010f).

3.0 Results and Analyses

3.1 Land Use

The land use data in Table 2 provide a comparison between the 14-digit hydrologic units covered within the study reach of the West Fork Black River study and the Ozark/Black/Current EDU.

3.2 Stream Habitat Assessment

Scoring results of the habitat assessment are found in Table 3. If the study station SHAPP score is $\geq 75\%$ of the control station score, the stations are considered to contain comparable habitats. Comparable habitats should be able to support comparable biological communities. Both stations scored $>75\%$ of the SHAPP control. These stations have comparable habitats and are expected to support comparable biological communities.

Table 3
Stream Habitat Assessment Scores and Percentage Comparison

Station	Score	% of Reference
West Fork Black 1	154	>100
West Fork Black 2	142	99.3
Sinking Creek (SHAPP Control)	143	-----

3.3 Biological Assessment and Macroinvertebrate Community Analyses

Tables 4 and 5 provide scoring criteria and results for the spring and fall index periods, respectively. MSCI scores were calculated by scoring station metrics against the appropriate Biological Criteria (BIOREF) scores located in the tables. An MSCI score of 16-20 results in an assignment of a fully supporting biological community. Both West Fork Black River stations scored an MSCI score of fully supporting for both sampling seasons.

Table 4
Bioreference (BIOREF) Criteria Metric Scores, Biological Support Category, and Macroinvertebrate Stream Condition Index (MSCI) Scores, Spring 2009

Stations	Sample No.	TR	EPTT	BI	SDI	MSCI	Support
West Fork Black River 1	0930039	93	33	5.0	3.63	20	Full
West Fork Black River 2	0930040	93	31	5.5	3.49	16	Full
BIOREF Score=5		>91	>31	<5.4	>3.29	20-16	Full
BIOREF Score=3		91-45	31-15	5.4-7.7	3.29-1.65	14-10	Partial
BIOREF Score=1		<45	<15	>7.7	<1.65	8-4	Non

MSCI Scoring Table (in light gray) developed from BIOREF streams (n = 15). TR=Taxa Richness; EPTT=Ephemeroptera, Plecoptera, Trichoptera Taxa; BI=Biotic Index; SDI=Shannon Diversity Index

Table 5
 Bioreference (BIOREF) Criteria Metric Scores, Biological Support Category, and
 Macroinvertebrate Stream Condition Index (MSCI) Scores, Fall 2009

Stations	Sample No.	TR	EPTT	BI	SDI	MSC I	Support
West Fork Black River 1	0918417	88	27	5.5	3.45	18	Full
West Fork Black River 2	0918416	86	27	5.7	3.37	18	Full
BIOREF Score=5		>83	>25	<5.1	>3.27	20-16	Full
BIOREF Score=3		83-41	25-13	5.1-7.5	3.27-1.63	14-10	Partial
BIOREF Score=1		<41	<13	>7.5	<1.63	8-4	Non

MSCI Scoring Table (in light gray) developed from BIOREF streams (n = 15). TR=Taxa Richness;
 EPTT=Ephemeroptera, Plecoptera, Trichoptera Taxa; BI=Biotic Index; SDI=Shannon Diversity Index

The spring 2009 macroinvertebrate community analysis is shown in Table 6. All three EPT orders were common at both test stations. Chironomidae was the dominant family at the stations followed by Elmidae at station #1 and Caenidae at station #2.

Table 6
 Spring 2009 Macroinvertebrate Community Analysis

Spring 2009			
West Fork Black River 1		West Fork Black River 2	
Order	%	Order	%
% Ephemeroptera	11.8	% Ephemeroptera	13.2
% Plecoptera	8.2	% Plecoptera	5.7
% Trichoptera	6.4	% Trichoptera	4.4
Total EPT %	26.4	Total EPT %	23.3
% Diptera	57.7	% Diptera	69.6
% Dominant Macroinvertebrate Families			
Chironomidae	51.3	Chironomidae	66.7
Elmidae	9.6	Caenidae	5.9
Leuctridae	4.4	Leuctridae	4.4
Baetidae	3.6	Elmidae	4.4
Hydracarina	3.6	Ephemellidae	3.3
Caenidae	3.5	Heptageniidae	2.2

The fall 2009 macroinvertebrate community analysis is shown in Table 7. Of the EPT taxa, both stations had high abundances of Ephemeroptera and Trichoptera but very low abundances of Plecoptera. Caenidae was the most dominant family at both stations followed by Chironomidae at station #1 and Elmidae at station #2.

Table 7
 Fall 2009 Macroinvertebrate Community Analysis

Fall 2009			
West Fork Black River 1		West Fork Black River 2	
Order	%	Order	%
% Ephemeroptera	33.7	% Ephemeroptera	37.3
% Plecoptera	0.1	% Plecoptera	0.3
% Trichoptera	24.9	% Trichoptera	18.2
Total EPT %	58.7	Total EPT %	55.8
% Diptera	18.4	% Diptera	16.3
% Dominant Macroinvertebrate Families			
Caenidae	16.3	Caenidae	21.8
Chironomidae	14.8	Elmidae	12.1
Leptoceridae	12.7	Chironomidae	12.0
Elmidae	11.6	Hyalellidae	7.9
Heptageniidae	8.0	Heptageniidae	7.5
Hydropsychidae	7.7	Hydropsychidae	6.5

3.4 Physicochemical Water Parameters

Physicochemical results from both sampling seasons can be found in Tables 8 and 9. None of the physicochemical water quality results were elevated and most likely did not have an effect on the biological community during the study seasons.

Table 8
 Spring 2009 Physicochemical Water Parameters

Stations	West Fork Black River #1	West Fork Black River #2
Parameters		
Ammonia as N (mg/L)	0.03*	0.03*
Chloride (mg/L)	2.79	2.4
Dissolved Oxygen (mg/L)	10.1	9.96
Flow (cfs)	129	102
pH (su)	8.40	8.10
Specific Conductance (μ S/cm)	267	262
Temperature (°C)	11.4	12.8
Turbidity (NTU)	< 1.00	< 1.00
Nitrate+Nitrite as N (mg/L)	0.08	0.10
Non-Filterable Residue (mg/L)	5.0	5.0
Total Nitrogen (mg/L)	0.15	0.14
Total Phosphorus (mg/L)	0.01*	0.01*

* Below detectable limits

Table 9
 Fall 2009 Physicochemical Water Parameters

Stations	West Fork Black River #1	West Fork Black River #2
Parameters		
Ammonia as N (mg/L)	<0.03*	<0.03*
Chloride (mg/L)	4.01	3.63
Dissolved Oxygen (mg/L)	8.53	9.03
Flow (cfs)	95.3	85.3
pH (su)	8.1	8.2
Specific Conductance (μ S/cm)	282	280
Temperature (°C)	14	14
Turbidity (NTU)	< 1.00	< 1.00
Nitrate+Nitrite as N (mg/L)	0.23	0.23
Non-Filterable Residue (mg/L)	<5.0*	5.0
Total Nitrogen (mg/L)	0.34	0.32
Total Phosphorus (mg/L)	<0.01*	0.03

* Below detectable limits

4.0 Discussion

Comparison of the percent land use cover of the EDU and the 14-digit HUC that contains the West Fork Black River study segments showed the study stations had more forest cover than the EDU as a whole. The EDU had a greater percentage of grasslands and urban areas.

Both SHAPP scores for West Fork Black River scored $\geq 75\%$ of Sinking Creek, the SHAPP control stream. Station 1 scored 11 points higher than the control stream and station 2 scored 1 point less than the control stream. West Fork Black River was characterized by having a wide, rocky channel consisting of both deep and shallow pools. The study stream had ample epifaunal substrate available and contained a variety of velocity and depth regimes. Sediment deposition was slightly higher at station 2. The only obvious signs of channel modifications were in the areas of bridge crossings. Neither site appeared to suffer from channelization. State Highway KK was located between the two stations and spanned the river. County Road 90 runs along the north side of the river west of State Highway KK. Bank stability was good at both stations. Vegetation protection of the banks was higher at station 1. Both stations ranked high with regard to the width of the riparian zone, despite CR 90 running alongside the river at station 2, which affected the riparian zone width for the first few habitat assessment transects.

The macroinvertebrate data did not reveal any impairment in West Fork Black River during either sampling season. When compared to bioreference streams, West Fork Black River scored in the fully supporting range for both seasons. Stations 1 and 2 scored 20 and 16 respectively during the spring. During the spring, station 2 had fewer EPT taxa and a higher BI value than station 1. During the fall, both stations scored 18

and had slightly higher BI values. Caenidae and Chironomidae were fairly common during the fall.

There was little variation in the community make up during each sampling season for West Fork Black River. Dominant families were fairly consistent between the study stations. During the spring sampling season, Chironomidae constituted greater than 50% of the taxa. Elmidae, Caenidae, and Leuctridae were fairly common. During the fall, Caenidae was the most common taxa at both stations, followed by Chironomidae at station 1 and Elmidae at station 2. Total EPT taxa ranged from 26.4% to 23.3% during the spring and 58.7% to 55.8% during the fall.

The physicochemical data do not show any significant trends. All values were fairly consistent for each sampling season. It appears that physicochemical water quality did not affect the biological community during the study seasons.

5.0 Conclusion

Three null hypotheses were stated in the introduction: 1) Habitat will not differ substantially among the West Fork Black River stations and the reference station; 2) macroinvertebrate assemblages will not differ substantially between longitudinally separate reaches of West Fork Black River; 3) macroinvertebrate assemblages will not differ substantially between West Fork Black River and the bioreference streams in the Ozark/Black/Current EDU.

Null hypothesis #1 is accepted. The SHAPP scores for the two West Fork Black River stations differed by 12 points. Station 1 scored higher than the SHAPP control, whereas station 2 scored 1 point less than the SHAPP control. The habitat quality of the two West Fork Black River stations is comparable to the reference station.

Null hypothesis #2 is accepted. The West Fork Black River macroinvertebrate samples exhibited similar dominant taxa and had MSCI scores in the fully supporting category at both sampling stations during each sampling season.

Null hypothesis #3 is accepted. The macroinvertebrate community of the West Fork Black River stations ranked as fully supporting when compared to the bioreference streams for both sampling seasons and, therefore, did not substantially differ from the MSCI calculated from the bioreference streams within the same EDU.

Overall, the bioassessment for West Fork Black River, WBID 2755, suggests no biological impairment due to water quality. The MSCI scores of both West Fork Black River stations during both seasons were ≥ 16 , indicating a fully supporting and healthy macroinvertebrate community when compared to the bioreference streams for that EDU. The physicochemical results revealed few definitive trends, other than typical seasonal differences.

6.0 Literature Cited

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Appendix A

Invertebrate Database Bench Sheet Report
West Fork Black River
Reynolds County
Grouped by Season and Station

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0918417], Station #1, Sample Date: 10/13/2009 12:15:00 PM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
"HYDRACARINA"			
Acarina	29	25	
AMPHIPODA			
Hyalella azteca			4
COLEOPTERA			
Berosus	1	1	
Dineutus			1
Dubiraphia		9	9
Ectopria nervosa	2		
Helichus basalis			1
Helichus lithophilus			2
Optioservus sandersoni	42	2	2
Psephenus herricki	13	1	
Stenelmis	76	3	1
DIPTERA			
Ablabesmyia		3	2
Antocha	1		
Atherix	2	1	
Ceratopogoninae	2	2	
Clinotanypus		1	
Cricotopus bicinctus	1	1	11
Cricotopus/Orthocladius	17	4	6
Cryptochironomus	1		
Dicrotendipes		1	1
Eukiefferiella	1		
Hemerodromia	21	2	2
Labrundinia			1
Microtendipes	19	7	1
Parakiefferiella		2	
Parametriocnemus	4		
Paratanytarsus			1
Polypedilum aviceps	2	1	
Potthastia	3	5	
Psectrocladius		1	3
Rheocricotopus	5	1	
Rheotanytarsus	9		4
Simulium	6	2	
Stempellinella	12	8	
Stenochironomus			1
Tabanus	2		

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0918417], Station #1, Sample Date: 10/13/2009 12:15:00 PM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Tanytarsus	17	5	7
Thienemanniella	3		
Thienemannimyia grp.	3	4	2
Tipula	1	1	
Tribelos		1	
Tvetenia	1		
EPHEMEROPTERA			
Baetis	14	2	1
Baetisca lacustris		1	
Caenis anceps	1	1	
Caenis latipennis	9	118	73
Centroptilum			1
Eurylophella	6	7	3
Isonychia bicolor	44	2	
Leptophlebiidae	1	6	3
Maccaffertium bednariki	27	3	
Maccaffertium mediopunctatum	7	2	
Maccaffertium pulchellum	15	2	3
Stenacron	16	8	
Stenonema femoratum	4	13	
Tricorythodes	6	9	9
ISOPODA			
Caecidotea		1	
LUMBRICINA			
Lumbricina		1	
LUMBRICULIDA			
Lumbriculidae			1
MEGALOPTERA			
Corydalus		3	
Nigronia serricornis		1	
MESOGASTROPODA			
Elimia			1
ODONATA			
Argia	1	5	1
Boyeria			-99
Calopteryx			5
Enallagma			2
Gomphidae	5	2	1
Hagenius brevistylus		5	8
Hetaerina			4
Libellulidae			1

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0918417], Station #1, Sample Date: 10/13/2009 12:15:00 PM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Macromia			3
Stylogomphus albistylus		1	
PLECOPTERA			
Leuctridae	1		
Perlinella ephyre	-99		
Zealeuctra		1	
TRICHOPTERA			
Ceratopsyche morosa grp	14		
Cheumatopsyche	77	3	2
Chimarra	1		
Helicopsyche	24	6	1
Nectopsyche			6
Oecetis	23	4	113
Oxyethira			7
Phryganeidae			2
Polycentropus	3	4	6
Triaenodes			12
TRICLADIDA			
Planariidae	1		
TUBIFICIDA			
Branchiura sowerbyi		1	
Tubificidae			2

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0918416], Station #2, Sample Date: 10/13/2009 11:00:00 AM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
"HYDRACARINA"			
Acarina	14	2	2
AMPHIPODA			
Allocrangonyx	1		
Hyalella azteca		3	96
COLEOPTERA			
Berosus	1	5	3
Dubiraphia		9	34
Macronychus glabratus			1
Optioservus sandersoni	17	2	
Psephenus herricki	12	2	2
Stenelmis	76	12	
DIPTERA			
Ablabesmyia		3	3
Antocha	2		
Atherix	3		
Ceratopogoninae	1	1	2
Chironomidae	1	1	
Chrysops		-99	
Cladotanytarsus	1		
Cricotopus bicinctus	3	1	2
Cricotopus/Orthocladius	28	3	4
Cryptochironomus		3	
Dicrotendipes		3	1
Empididae	1	6	
Eukiefferiella	1		1
Forcipomyiinae	1		
Hemerodromia	6		1
Hexatoma	20	5	
Labrundinia			1
Microtendipes	15	3	
Ormosia	1		
Parakiefferiella		5	
Paralauterborniella		1	
Parametriocnemus	4	5	
Potthastia	2	2	1
Psectrocladius	1	1	6
Pseudochironomus	1	7	
Rheotanytarsus	1		1
Stempellina	1		

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0918416], Station #2, Sample Date: 10/13/2009 11:00:00 AM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Stempellinella	8	3	
Stictochironomus		2	1
Tabanus	3	-99	
Tanytarsus	5	3	1
Thienemanniella	3		
Thienemannimyia grp.	2	3	
Tipula		1	
Tribelos		1	1
EPHEMEROPTERA			
Baetis	10		
Baetisca lacustris		1	
Caenis anceps	3		
Caenis latipennis	28	195	46
Centroptilum		2	1
Eurylophella	21	3	3
Hexagenia limbata		-99	
Isonychia bicolor	20		1
Leptophlebiidae	3	3	3
Leucrocuta	1		
Maccaffertium bednariki	43	1	
Maccaffertium mediopunctatum	9		
Stenacron	27	1	
Stenonema femoratum	10	2	
Tricorythodes	20	7	1
ISOPODA			
Caecidotea		1	
LIMNOPHILA			
Physella	1		1
LUMBRICINA			
Lumbricina	2	1	
MEGALOPTERA			
Corydalus	-99		
MESOGASTROPODA			
Elimia	3	-99	
ODONATA			
Argia		7	
Calopteryx			3
Enallagma			4
Gomphidae	2	5	1
Hagenius brevistylus		7	2
Ischnura			1

Aquid Invertebrate Database Bench Sheet Report**West Fk Black R [0918416], Station #2, Sample Date: 10/13/2009 11:00:00 AM****CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence**

ORDER: TAXA	CS	NF	RM
Macromia		1	3
Ophiogomphus		-99	
PLECOPTERA			
Neoperla	1		
Perlidae	1	1	
Zealeuctra	1		
TRICHOPTERA			
Ceratopsyche morosa grp	11		1
Cheumatopsyche	65	4	1
Chimarra	3	5	
Helicopsyche	62	1	1
Lepidostoma	1		
Oecetis	11	2	31
Oxyethira			6
Polycentropus	2	5	4
Triaenodes			11
TRICLADIDA			
Planariidae	4		
TUBIFICIDA			
Tubificidae			1

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0930040], Station #2, Sample Date: 4/17/2009 12:00:00 PM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
"HYDRACARINA"			
Acarina	4	2	
AMPHIPODA			
Allocrangonyx		2	
Hyalella azteca	1	-99	6
COLEOPTERA			
Dineutus			-99
Dubiraphia	3	1	3
Ectopria nervosa	1		
Macronychus glabratus		1	
Microcylloepus pusillus	5	1	
Psephenus herricki	1		
Stenelmis	40	2	
Tropisternus			-99
DECAPODA			
Orconectes hylas	-99		
DIPTERA			
Ablabesmyia	2	4	1
Ceratopogoninae	5	11	
Chaetocladius			1
Chironomidae	7		2
Cladotanytarsus	11	19	
Clinocera		1	
Corynoneura		4	2
Cricotopus bicinctus	1	2	19
Cricotopus/Orthocladius	54	11	45
Dasyheleinae	1		
Dicrotendipes		39	
Eukiefferiella brevicalcar grp	14		5
Euparyphus		1	
Harnischia		1	
Hemerodromia	4	4	4
Hexatoma	2		
Labrundinia			2
Larsia	1	1	4
Micropsectra	1		
Microtendipes	35	7	
Nilotanypus	2		3
Parakiefferiella	1	7	1
Parametriocnemus	3	3	2

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0930040], Station #2, Sample Date: 4/17/2009 12:00:00 PM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Paratanytarsus	1		1
Phaenopsectra		2	
Polypedilum aviceps	16	2	
Polypedilum convictum	85	1	11
Polypedilum illinoense grp	1	1	2
Potthastia	54	39	6
Psectrocladius		2	2
Rheocricotopus	3		1
Rheotanytarsus	16	1	19
Simulium			2
Stempellinella	9	18	9
Tabanus	2		
Tanytarsus	76	26	26
Thienemanniella	2	2	12
Thienemannimyia grp.	38	32	12
Zavrelimyia			1
EPHEMEROPTERA			
Acentrella	4		3
Baetis	8		2
Caenis latipennis	37	28	11
Eurylophella	3		2
Eurylophella bicolor	20	7	10
Eurylophella enoensis			1
Heptageniidae	12	2	3
Isonychia bicolor	2		
Maccaffertium bednariki	2	1	
Maccaffertium mediopunctatum	1		
Maccaffertium pulchellum	-99		2
Stenacron	3		
Stenonema femoratum	-99	2	
Tricorythodes	2		
ISOPODA			
Caecidotea (Blind & Unpigmented)	3		
MEGALOPTERA			
Nigronia serricornis	1		
MESOGASTROPODA			
Elimia	-99	-99	1
ODONATA			
Calopteryx			-99
Enallagma			1

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0930040], Station #2, Sample Date: 4/17/2009 12:00:00 PM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Gomphidae		1	
Stylogomphus albistylus	2		
PLECOPTERA			
Amphinemura	2		2
Isoperla	-99		
Leuctridae	17	28	12
Perlesta	7	1	
Perlinella ephyre	3	-99	
Pteronarcys pictetii			1
TRICHOPTERA			
Ceratopsyche morosa grp	1		
Cheumatopsyche	18		1
Chimarra	2		
Helicopsyche	3		2
Hydatophylax			-99
Hydroptila			1
Oecetis	1		1
Oxyethira			14
Polycentropus	3	1	4
Setodes	4		
Triaenodes			1
TRICLADIDA			
Planariidae	1		
TUBIFICIDA			
Enchytraeidae			1
Tubificidae	1		
VENEROIDA			
Pisidiidae	2		

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0930039], Station #1, Sample Date: 4/17/2009 10:45:00 AM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
"HYDRACARINA"			
Acarina	6	34	3
AMPHIPODA			
Allocrangonyx		2	
COLEOPTERA			
Ancyronyx variegatus			1
Dubiraphia	1	10	2
Optioservus sandersoni	43	2	
Psephenus herricki	2		1
Stenelmis	39	15	
DECAPODA			
Orconectes hylas		1	
DIPTERA			
Ablabesmyia	1	10	3
Ceratopogoninae	11	21	1
Chironomidae	4	1	
Chironomus		1	
Cladotanytarsus		6	
Corynoneura	1	1	
Cricotopus bicinctus	5		12
Cricotopus/Orthocladius	24	5	16
Dicrotendipes		5	
Eukiefferiella brevicalcar grp	18		5
Gonomyia			1
Harnischia		1	
Hemerodromia	7	1	1
Larsia	2	1	4
Microtendipes	2	6	1
Natarsia		1	
Nilotanypus	2		4
Pagastiella		1	
Parakiefferiella	1	9	
Parametriocnemus	2	4	
Paratanytarsus			1
Paratendipes		1	
Phaenopsectra		1	1
Polypedilum aviceps	33		9
Polypedilum convictum	119		28
Polypedilum illinoense grp	1		
Potthastia	18	22	10

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0930039], Station #1, Sample Date: 4/17/2009 10:45:00 AM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Psectrocladius		4	
Pseudochironomus		2	
Rheocricotopus	2		3
Rheotanytarsus	9	1	33
Simulium	15		17
Stempellinella	2	13	
Tabanus	-99	-99	
Tanytarsus	32	28	7
Thienemanniella			15
Thienemannimyia grp.	12	28	5
Tipula	-99	-99	
Tvetenia bavarica grp	1		
EPHEMEROPTERA			
Acentrella	11		16
Baetis	8	1	6
Caenis latipennis	3	37	2
Centroptilum		1	
Ephemerella invaria	1		2
Ephemerellidae	1		
Eurylophella bicolor	3	7	6
Eurylophella enoensis			3
Heptageniidae	7		2
Isonychia bicolor	5		1
Leptophlebiidae	1		
Maccaffertium bednariki	1		
Maccaffertium mediopunctatum	3		
Maccaffertium pulchellum	2		3
Stenacron	1		1
Stenonema femoratum	-99	1	1
Tricorythodes	1		
LIMNOPHILA			
Physella		1	
LUMBRICINA			
Lumbricina		2	
MEGALOPTERA			
Corydalus	1		
Nigronia serricornis	-99	-99	
ODONATA			
Argia		1	
Boyeria			-99
Calopteryx			2

Aquid Invertebrate Database Bench Sheet Report

West Fk Black R [0930039], Station #1, Sample Date: 4/17/2009 10:45:00 AM

CS = Coarse; NF = Nonflow; RM = Rootmat; -99 = Presence

ORDER: TAXA	CS	NF	RM
Hagenius brevistylus		2	
Hetaerina			1
Stylogomphus albistylus		-99	
PLECOPTERA			
Acroneuria	-99		
Amphinemura	7		4
Isoperla	1		
Leuctridae	20	26	6
Perlesta	10		22
TRICHOPTERA			
Ceratopsyche morosa grp	1	-99	2
Cheumatopsyche	35		3
Chimarra	1		
Helicopsyche	7		1
Hydroptila		1	
Lepidostoma			1
Oecetis			2
Oxyethira			8
Polycentropus	1	1	2
Setodes	5	1	
Triaenodes			3
TRICLADIDA			
Planariidae	4		
TUBIFICIDA			
Limnodrilus hoffmeisteri		1	
Tubificidae		8	